

REMARKS

Claims 1-7 and 9-13 are pending in the application with claims 1-7, 9 and 10 under active consideration. Claim 8 was previously cancelled.

The office rejected claims 1-7, 9 and 10 under 35 U.S.C. § 103(a) over van der Slot (Organometallics, 2002, 21, 3873-3883) and Billig (Kirk-Othmer Encyclopedia of Chemical Technology, 1996, "oxo process" pages 1-17).

In the reply filed December 3, 2008 in response to the final office action mailed October 3, 2008, applicants noted that the combination of the claimed bidentate ligands and monodentate ligands gave unexpected results compared to the cited references. In the advisory action mailed January 13, 2009, the office noted that the comparative examples given in the specification were for catalyst compositions containing only monodentate ligands or only bidentate ligands. In addition, the office concludes:

"One of ordinary skill in the art would be invited to try to combine a monodentate ligand such as TPP, which as stated by Billig is the gold standard in hydroformylation with the bidentate ligand of van der Slot et al. In making the combination, the person or ordinary skill would try out various ratios of TPP to bidentate ligand to check out which is the best ratio for hydroformulation. Therefore, applicant's claim of synergy is not necessarily unexpected since the various ratios of TPP to bidentate ligand would actually make different in situ catalysts that are like what is shown in Scheme 2 of van der Slot et al."

First, applicants note that the comparative examples given in the specification were commensurate in scope with the references (i.e. either a monodentate ligand or bidentate ligand). The office appears to be requiring unexpected results based on the applicants own disclosure (i.e. combining the two types of ligands). Applicants have demonstrated that superior or unexpected results are obtained with the claimed catalyst composition relative to the prior art. Applicants submit that it is improper to use the applicants own disclosure to establish the standard for superior or unexpected results (see *Graham v. John Deere Co. of Kansas City*, 383 US at 36, where the court cautions against "reading into the prior art the teaching of the invention in

issue”). Applicants submit that a showing of superior or unexpected results were demonstrated relative to the cited references, and accordingly, this showing rebuts any *prima facie* case of obviousness (see MPEP 2145 (VII)).

Second, the office concludes one of ordinary skill in the art would be motivated to utilize both a monodentate and bidentate ligand simply because Billig uses a monodentate ligand and van der Slot uses a bidentate ligand. Applicants submit this is a conclusory argument by the office and again the office is using applicants own disclosure to provide the motivation to combine. Again, as noted above the courts have cautioned against this type of analysis.

Specifically, applicants note that neither reference teach or suggests combining mono- and bi- dentate ligands. The office suggests that such a combination is “like what is shown in Scheme 2 of van der Slot”. Applicants submit that this is incorrect. Scheme 2 in van der slot is for a bidentate only catalyst system and conformations 9 and 10 in scheme 2 are not the same as having a monodentate and a bidentate ligand.

One last note with regard to van der Slot is that van der Slot utilized monodentate ligands (1 and 2) as well as bidentate ligands (3 and 4), and yet, van der Slot failed to combine the two types of ligands into a single catalyst composition. If the combination were obvious, then van der Slot, who is presumably one skilled in the art, would have combined them. Therefore, the claimed composition would not have been obvious over the cited reference, and accordingly, applicants respectfully request that the office withdraw the rejection of claims 1-7, 9 and 10 under 35 U.S.C. § 103(a) over van der Slot and Billig.

With regard to the office’s conclusion that “synergy is not necessarily unexpected” and as further evidence of superior or unexpected results, applicants submit the following experimental data. The data illustrate selectivity and activity data for three catalyst systems containing a bidentate (comparative example 4 using BPO-P(PyI)₂), a monodentate ligand (comparative example 5 using EP) and both a monodentate and bidentate ligand (comparative example 6 using BPO-P(PyI)₂ and EP).

The experimental parameters are given below and the results are summarized in table 3.

Comparative Example 4: Hydroformylation of propene using acetylacetonatodicarbonylrhodium (Rh(AcAc)(CO)₂) catalyst a and 1,1’-biphenyl-2,2’-diyl-bis(dipyrrolylphosphoramidite) (BPO-P(PyI)₂)

The experiment for catalytic activity was performed in the same manner as in Example 1 given in the specification except that BPO-P(Py1)₂ was used alone as a ligand and a molar ratio of ligand to rhodium was 3.

Comparative Example 5: Hydroformylation of propene using acetylacetonatodicarbonylrhodium (Rh(AcAc)(CO)₂) catalyst and eicosyl phobane (EP)

The experiment for catalytic activity was performed in the same manner as in Comparative Example 4 except that EP was used instead of BPO-P(Py1)₂ as a ligand, and a molar ratio of ligand to rhodium was 3.

Comparative Example 6: Hydroformylation of propene using acetylacetonatodicarbonylrhodium (Rh(AcAc)(CO)₂) catalyst, 1,1'-biphenyl-2,2'-diyl-bis(dipyrrolylphosphoramidite) (BPO-P(Py1)₂) and eicosyl phobane (EP)

The experiments for catalytic activity were performed in the same manner as in comparative Example 4 except that BPO-P(Py1)₂ and EP was used instead of BPO-P(Py1)₂ as a ligand, and molar ratio of ligand to rhodium was 3.

Table 3

	Catalyst	Ligand 1 (L1)	Ligand 2 (L2)	L1Rh Mol/mol	L2/Rh Mol/mol	N/I	Catalytic activity (mol _{BAL} /mol _{Rh} /h)
Comparative Example 4	Rh(AcAc)(CO) ₂	BPO-P(Py1) ₂	-	3	-	13.9	149.8
Comparative Example 5	Rh(AcAc)(CO) ₂	-	EP	-	3	1.35	136.8
Comparative Example 6	Rh(AcAc)(CO) ₂	BPO-P(Py1) ₂	EP	3	3	16	8.5

As shown in Comparative Example 6 of Table 3, mixing a bidentate ligand (BPO-P(Py1)₂) and a monodentate ligand (EP) decreases catalytic activity of catalyst composition in comparison with Comparative Examples 4 and 5 that use only a monodentate or a bidentate ligand. Thus, a mixing of a bidentate ligand (BPO-P(Py1)₂) and a monodentate ligand (EP) does not necessarily give an unexpected or superior result as suggest by the office. Therefore, the specifically claimed ligand compositions and specifically claimed concentrations would not have been obvious over the cited references since not all monodentate/bidentate catalyst systems give unexpected or superior results. Accordingly, the results are unexpected and applicants respectfully request that the office withdraw the rejection of claims 1-7, 9 and 10 under 35 U.S.C. § 103(a) over van der Slot and Billig.

Finally, applicants respectfully request that, if elected claims 1-7, 9 and 10 are found allowable, the office rejoin non-elected claims 11-13. Applicants note process claims 11-13 contain all the limitations of claim 1, and therefore, are eligible for rejoinder (MPEP § 821.04).

In light of the remarks above, applicants submit the application is in condition for allowance. Favorable reconsideration is respectfully requested.

If there are any charges due with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

CANTOR COLBURN, LLP

By: /Donald K. Drummond/
Donald K. Drummond
Registration No.: 52,834

Date: February 13, 2009
Cantor Colburn LLP
1800 Diagonal Road
Suite 510
Alexandria, VA 22314
Telephone: (703) 236-4500
Facsimile: (703) 236-4501